

## Perception of Work Discomfort Distributing Factors among TVET Employees

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**Abstract:** The increased cases of musculoskeletal disorders (MSD) and work discomfort are commonly reported among office workers. This study uses the macroergonomic approach survey that design to investigate work discomfort contributing factors and the level of ergonomics awareness among polytechnic employees. The factors involved are the perceptions of employees for work environment, equipment, task, workplace, and management components. The study was carried on 300 respondents from polytechnics in Malaysia and their perception's on macroergonomic factors was analyzed. The result shows a moderate level of ergonomics awareness among the members in the institution and good work environment are characterized as the main ergonomics attributes in the work system. Neck, shoulders, and lower back pain are the common discomforts that affect the wellbeing of staffs in polytechnics. From this study, few recommendations were made to Malaysia polytechnics as to improve the ergonomics conditions in their work system components.

**Key words:** ergonomics, environment, awareness, work systems, musculoskeletal disorder

### 1.0 INTRODUCTION

In this rapid manufacturing era and competitive working environment, ergonomics has become a solution to health and safety at the workplace. The knowledge of ergonomics is important for both parties, higher educational institutes and industries. It consists of results-oriented training programs, communication tools, policy statements, measurements systems, guidelines for implementation and self-assessment, periodic audits, and employee involvement [1]. Ergonomics (or human factor) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance [2]. Ergonomics help to integrate things that interact with people in terms of people's abilities, limitations and needs or in other words it is fitting the tasks to the person.

### 1.1 Problem Statement

Current trend in working environment lead the workers to use machinery, computers, and adapt with different

risks at the workplace. Unfortunately, the human body has the limitations and capabilities. Working environment which mismatch the human abilities, human limitations, and human characteristics will lead to stress [3], injuries, accidents and inefficiencies [4]. Bad workplace design and poor work organization are part of the contributing factors to the occupational safety and health problems. Workplace design plays a critical role in the development of Musculoskeletal Disorder (MSD). There are three primary ergonomics risk factors at the workplace [5]:

- High task repetition and cyclic processes
- Forceful exertions and high loads on human body or muscle
- Awkward postures for sustained period of time

According to National Institute of Occupational Safety and Health (NIOSH) chairman Tan Sri Lee Lam Thye, "The reported cases of MSD has been increasing in this country since 2008 (*The Star Online*, 3 December 2012)". The number of accidents related to musculoskeletal diseases increased from 14 cases in 2006 to 517 cases in 2013. Implication from the increasing number of occupational diseases, the amount

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of compensation by SOCSO is also increases; economic costs place a considerable burden to the country and decreased worker morale. Ergonomics awareness is the first step to implement ergonomics effectively [6]. Without ergonomics awareness, effort to endorse ergonomics implementation are tough. Consequently, it is difficult to determine the suitable prevention program for the organization [7].

Refer to Salvinder and Ahmad Rasdan [8], experimental study of thermal comfort assessment, revealed that the level of CO<sub>2</sub> in a closed laboratory in one of Malaysian polytechnic exceeded the hazardous level which can cause the students to experience decreases satisfaction and faster level of boredom due to perception of poor air quality. Based on the trend above, it is very significant to determine the level of ergonomics awareness and perception on work discomfort contributing factors among polytechnic employees. The outcome of this study hopefully can determine the main components that contribute to the ergonomics factors in the workplace and provide few recommendations as to improve the information about ergonomics practices in Malaysia particularly in the context of public higher educational institutions.

### 1.2 Objectives

In order to achieve the aim of this study, listed below are the objectives of the study:

- i. To investigate the level of ergonomics awareness among the polytechnic employees in Malaysia
- ii. To determine the main work discomfort contributing factors among polytechnic employees

## 2.0 METHODS

In this study, a set of questionnaire was used to determine the work discomfort factors among the staff in Malaysia polytechnics. The procedure of development of the questionnaire was based on the international literatures, and macroergonomics factors involved. The data associated with comments, suggestions, field observation, and interviews were analysed quantitatively. In conducting the survey, convenience sampling method been used and only 10 polytechnics gave approval to conduct the study. Therefore, this research only consists approximately 300 number of participants, and at least 30 number of respondents from each polytechnics. According to Carmen et al. [9], a good general rule of thumb for factor

analysis is 300 cases or the more lenient 50 participants per factor. The questionnaire consists of three sections namely section A; demographic information of the respondent, section B; respondents' perceptions on work discomfort contributing factors, and section C; screening the musculoskeletal symptoms in an ergonomics context [10]. The analysis used the SPSS statistical software package. First, descriptive statistics were computed for all the questionnaire responses.

## 3.0 RESULTS

### 3.1 Demographic Information

Majority of the respondents are from lecturers group with 245 (81.7%). About one third of the respondents are from department of mechanical engineering (JKM) and female respondents are constituting of 169 (56.3%) while the rest are male respondents constituting of 131 (43.7%). Common respondents are between ages 31 to 40 years old which consisted of 187 (62.3%) and 262 (87.3) respondents are right handed persons.

### 3.2 Questionnaire Responses for Work Discomfort Contributing Factors

The respondents were also asked about their perception towards the work discomfort contributing factors or macroergonomics factors including employee perception, work environment, equipment they used, workplace and management involvement. The study found that 85.7% of respondents understand that ergonomics is important in the work system. With an overall mean of 3.80, they also agreed that each organization needs to implement ergonomics at workplace with 263 (87.7%) respondents. The employees moderately agreed that overall level of ergonomics awareness is good with mean value of 3.51. Majority respondents agreed that lighting condition provided is sufficient to avoid glare and reflection with score mean 3.98. From the data, it is known that 222 (74%) respondents agreed with the floor condition and good housekeeping in their work area. Only 200 (66.7%) respondents agreed that the temperature and humidity in their workplace are in good state. It is clearly shown that all items for respondent perceptions towards the ergonomics factor for equipment used are moderate with an overall mean is 3.58. This value indicates that, there can be improvement activities for the equipment used in the institution and the respondents are really concern about the ergonomics in design for each equipment specification used.

The findings indicate that the level of respondents perception for task factor and activities assigned to them are at moderate level with mean score is 3.38. According to few comments from the lecturers, this situation is occurred because of increasing number for administrative works in certain events in the institution, and absence of staff assists in certain courses. In a moderate scale, about 151 (50.4%) respondents agreed that the equipment used in any activities is appropriate to complete the tasks and with mean score 3.42, only 141 (47%) agreed that all tasks being done in their workplace always considered ergonomics factors. Only 141 (47%) satisfied with all the work loads, rest period, and activities assigned to them, while 56 (18.6%) are disagreed with the statement. The lowest mean score is 3.28, which refers to ergonomics information in their workplace is accessible and well presented.

From their perception, the workplace is adequate to complete their work, not too conducive nor too poor condition. The highest mean score is 3.73, with 194 (64.7%) respondents agreed that they are satisfied with the height of their work surface. Majority of the respondents are satisfied with their personal work area with high mean score 3.72. About 177 (59%) respondents agreed that they are satisfied with the seating arrangement in the workplace, and moderate mean score is 3.62. The lowest mean score is 3.58, which revealed that only 177 (59%) respondents are satisfied with the chair design in their workplace. From the respondents' feedback, those with obese problem and pregnancy women are easily feel discomfort with the chair design and the seating arrangement [11]. One third of the respondents agreed that ergonomics or human factors is widely practice in the institution. Meanwhile, only 108 (36%) of the respondents agreed that management is highly committed in ergonomics and only 89 (29.7%) respondents are totally agreed that management often conduct ergonomics training.

## 4.0 DISCUSSION

### 4.1 Level of Ergonomics Awareness

This study demonstrated that the level of ergonomics awareness among polytechnics employees are moderate with mean score average is 3.51. Even though, the study found that 85.7% of respondents understand that ergonomics is important in the work system and agreed that the organization needs to implement ergonomics at workplace with 263 (87.7%) respondents. Without

proper training, they are not able to identify ergonomics problems in the workplace. These findings are supported by the fact that there was no ergonomics training being conducted and no specific guidelines regarding ergonomics in polytechnics to be referred to.

### 4.2 Main Work Discomfort Contributing Factors

This study discovered, the main work discomfort contributing factors from the employees perception are the environmental attributes (3.79), followed by workplace (3.65), equipment (3.58) and task (3.38). The lowest value for overall mean score is management factor with 3.04.

From a wide view of environmental aspects in the work system, it is shown that the work environment in polytechnic is not a vast ergonomics issue.

High perception from the respondents about the lighting, temperature and humidity, housekeeping, air condition and air circulation systems in the workplace show that these facilities are performing well and properly maintained. Few interesting comments in the findings related to work system environment evaluation aspects are the request to upgrade old facilities in the polytechnics such as number of air conditions and space for certain work area especially workshops, lecturer offices, and lecture rooms. Related the comments to safety and health at workplace, there is introduction of sick building syndrome in the old polytechnics building.

The role of human factors (HF) and ergonomics in polytechnic institution are very importance as to enhance the occupational safety and health practices and to build a comfort environment. The early introduction and implementation of ergonomics at workplace perhaps can shift the paradigm of the community and organization towards the safety and health culture in the workplace [6].

## 5.0 CONCLUSION

The analysis of the level of ergonomics awareness among polytechnics members are at moderate level (3.51). Even though all the respondents agreed that ergonomics is important and the benefits for ergonomics implementation at workplace are remarkable. Without proper training and strategic development regarding ergonomics, the execution is meagre.

This study found that environment attributes are the main work discomfort contributing factors to ergonomics evaluation followed by workplace, equipment, task, and management. Moderate mean scores for related work discomfort contributing factors show that a lot of improvement can be made for work related ergonomics risk factors involved to control the level of exposure to musculoskeletal injury. Management should play a serious role as to promote and implementing ergonomics at the workplace. This study revealed that for the last 12 months, there were high prevalence of musculoskeletal symptoms in neck, shoulders, and lower back of body regions.

From a general observation and short interview among the respondents, poor adjustment of the equipment in the workplace such as monitor, keyboard, chair and prolong seat with static posture without proper break or rest period are among the risk factors for WRMDS in their workplace. There is significance differences for gender in work discomfort for following body parts, neck, shoulders, upper back, both hips or thighs and buttocks, and ankles or feet. In addition, there are no significance difference for other factors such as age, service period, and handedness. Via this macroergonomics approach survey, it is hard to find the correlation between the musculoskeletal prevalence and work discomfort contributing factors. In conclusion, this method of sociotechnical study shows negative correlation between the prevalence of musculoskeletal injuries and satisfaction evaluation from the work discomfort contributing factors.

Work discomfort and musculoskeletal symptoms are preventable. Based on the findings and discussion, listed below are the recommendations and conceptual framework to Malaysia polytechnics or any organization in order to improve the ergonomics contributing factors in their work system:

- i. Provide ergonomics training in the institution.
- ii. Upgrade and improve maintenance schedule for equipment and reduce old building symptoms.
- iii. Appoint ergonomics officer in the occupational safety and health (OSH) committee.
- iv. Redesign and reposition the work space layout and equipment.
- v. Provide specific ergonomics guidelines and manuals for the institution.
- vi. Reorganize workload and provide quality work rest period.

- vii. Management involvement in ergonomics implementation and evaluation in workplace.

## 6.0 REFERENCES

- [1] Martin G. Helander, George J. Burri, Cost effectiveness of ergonomics and quality improvements in electronics manufacturing. *International Journal of Industrial Ergonomics*, Volume 15, Issue 2, February 1995, Pages 137-151
- [2] International Ergonomics Association (IEA) Technical Information, 2014. Human Factors and Sustainable Development. Available from: <http://www.iea.cc/> (accessed 27.11.14.)
- [3] Nurul Afida Isnaini Janipha, Arniatul Aiza Mustapha, Faridah Ismail, Workplace Stress amongst Consultants in Practice. *Procedia - Social and Behavioral Sciences* 68 (2012) 183 – 191
- [4] Jan Dul, W. Patrick Neumann, Ergonomics contributions to company strategies. *Applied Ergonomics* 40 (2009) 745–752
- [5] Susan M. Moore, Janet Torma Krajewski, Lisa J. Steiner, Practical demonstration of ergonomic principles. DHHS (NIOSH) publication no. 2011-191(2011)
- [6] Zafirah Ab Muin, Maimunah Sapri, Level of organization awareness on the importance ergonomics to health and safety at the workplace. 4th International Conference on Business and Economic Research (2013)
- [7] Daruis, D.D.I, Ramli S., Investigation on ergonomics among video unit display users – a case study among office workers in UPNM. *Advanced Engineering Forum* Vol. 10 (2013), 143-147
- [8] Salvinder Singh, Ahmad Rasdan Ismail, Thermal comfort assessment in a closed air conditioned ICT Laboratory at Ungku Omar Polytechnic, Malaysia. *Advanced Materials Research* Vols. 383-390 (2012) pp 5426-5431
- [9] Carmen R. Wilson and Betsy L. M., Understanding power and rules of thumb for determining sample sizes. *Tutorials in Quantitative Methods for Psychology* (2007), Vol. 3 (2), 43 – 50
- [10] Kuorinka et al., Standardised Nordic questionnaire for the analysis of musculoskeletal symptoms (1987), Vol. 18 (3) 233 - 237
- [11] Allan St. John Holt, Principles of Health and Safety at Work. 8th Edition, Routledge (IOSH), 2014. p.186